



Installation and Service Manual

Domestic and Export Models

Dentsply®/Cavitron® MODEL 3000™

**Ultrasonic Dental Unit
with phase lock automatic fine tuning**

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Foreword

The Dentsply/Cavitron 3000 Ultrasonic Dental Unit is precision engineered and manufactured. Designed for use in prophylaxis treatment, periodontia and other areas of operative dentistry, the Unit is manufactured by the Professional Division of Dentsply International.

Essentially, the Unit operates by converting ordinary AC house current into 30,000 Hz current. This in turn is converted by means of the handpiece and insert into 30,000 microscopically small mechanical strokes per second. These rapid, microscopic strokes are then transmitted to the insert tip. Applied with a water spray and a light guiding touch, the activated tip, in conjunction with the bubbling action of the water, rapidly and gently dislodges calculus and stain.

CAUTION

The Dentsply/Cavitron Unit should not be used for restorative dental procedures involving the condensation of amalgam.

PRECAUTIONS: No special maintenance is required for the Dentsply/Cavitron Ultrasonic Dental Unit, but the following precautionary measures should be exercised:

- a. Do not place the Unit on or next to a radiator or other heat source as this may damage the electronic components.
- b. Do not keep the Unit in a tightly confined space or corner. Keep it where a normal amount of air will freely circulate on all sides of the cabinet.
- c. The Unit is portable, but when carrying it from one place to another, handle it with care.
- d. **THE IMPORTANCE OF THE FOLLOWING INSTRUCTIONS OUTLINED IN THE DENTIST'S INSTRUCTION MANUAL CANNOT BE OVER-EMPHASIZED. IMPROPER ANGULATION OF**

THE INSERT TIP TO THE TOOTH WILL DEFINITELY RESULT IN SUB-STANDARD PERFORMANCE OF THIS PRECISION EQUIPMENT.

WARNING

Persons fitted with cardiac pacemakers, defibrillators, and other active implanted medical devices, have been cautioned that some types of electronic equipment might interfere with the operation of the device. Although no instance of interference has ever been reported to DENTSPLY, we recommend that the handpiece and cables be kept at least 6 to 9 inches (15 to 23 cm.) away from any device and their leads during use.

There are a variety of pacemakers and other medically implanted devices on the market. Clinicians should contact the device manufacturer or the patient's physician for detailed information about the device.

TECHNICAL SUPPORT

For technical support and repair assistance in the U.S., call 1-800-989-8826 Monday through Friday, 8:00 AM to 5:00 PM (Eastern Time). For other areas, contact your local DENTSPLY® representative.

SUPPLIES & REPLACEMENT PARTS

To order supplies or replacement parts in the U.S., contact your local DENTSPLY® Professional Distributor or call 1-800-989-8826 or 717-767-8502 Monday through Friday, 8:00 AM to 5:00 PM (Eastern Time). For other areas, contact your local DENTSPLY® representative.

Specifications

ELECTRICAL	<u>Voltage:</u>	100V Model G-110J 115V Models G-110, G110C 220V Model G-110B 240V Model G-110A	<u>Current:</u>	0.8 amps at 100V and 115V 0.4 amps at 220V and 240V
WATER	<u>Pressure:</u>	25-60 psig	<u>Frequency:</u>	50/60 Hertz
	<u>Flow Rate:</u>	Min. position - (counterclockwise 300° ±5°) <30 cc max. Max. position - (clockwise 300° ±5°) >60 cc min.		at 45 ± 2 psig
SHIPPING WEIGHT		With Accessories: 9 lbs		
DIMENSIONS	<u>Height:</u> <u>Width:</u> <u>Depth:</u>	4 in. 7-3/8 in. 7-5/8 in.	Handpiece Cable Length: 80 in. Footswitch Cable Length: 96 in. Line Cord Length: 84 in. Water Hose Length: 96 in.	

CAUTION

**U.S. FEDERAL LAW RESTRICTS THIS DEVICE TO SALE BY
OR ON THE ORDER OF A DENTAL PROFESSIONAL.**

SECTION I – Description

COMPONENTS

The Unit has four major components: an electronic generator, a handpiece assembly, a set of interchangeable inserts, and a foot control.

1. Generator and Water System

The electronic generator enclosed in the cabinet produces the power required for activating the handpiece. The following controls are located on the front panel (Figure 1):

- 1) On/Off Indicator – lights when the unit is on (when the pushbutton has been actuated).
- 2) Power Adjustment Knob – selects the power level for operation. A generator enclosed in the cabinet produces the power required for activating the handpiece.
- 3) Water Flow Adjustment Knob – adjusts the volume of water permitted to flow from the handpiece.

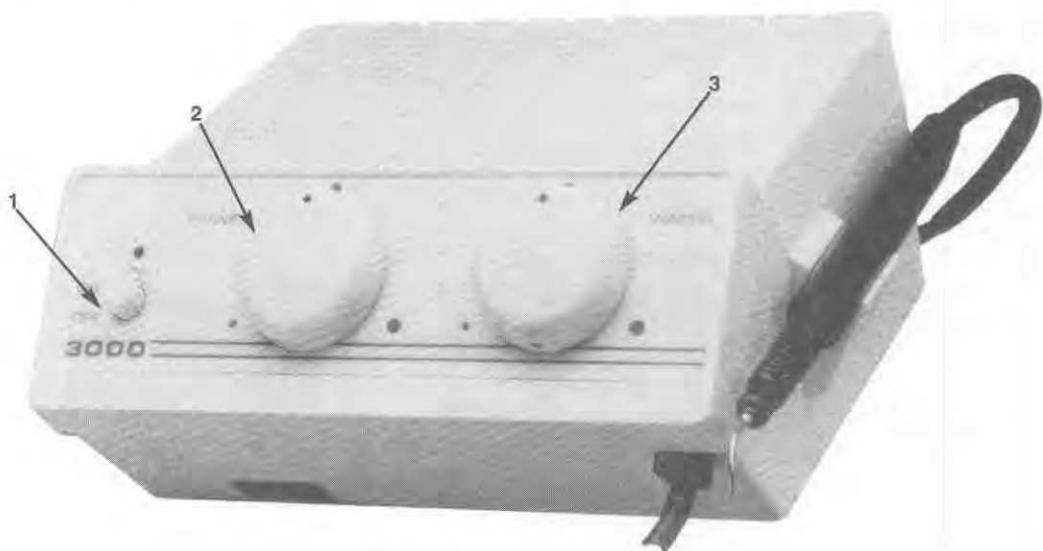


FIGURE 1. UNIT CONTROL PANEL

NOTE

Because the water is heated in the handpiece, adjustment of the water flow rate controls water temperature. The greater the water flow, the lower the water temperature; the lesser the water flow, the higher the water temperature.

2. Handpiece and Cable Assembly

The Handpiece and Cable Assembly consists of a handpiece which is the housing for the interchangeable inserts, and a cable.

- a. The open end of the handpiece is designed to accept all 30K Cavitron inserts (Figure 2). Before installing the insert, hold the handpiece vertically over a suitable drain, activate the foot control and allow the water to fill the handpiece. Place the Cavitron insert into the handpiece. **WITH THE INSERT IN PLACE, HOLD HANDPIECE IN AN UPRIGHT POSITION. ACTIVATE THE INSERT TO BLEED ANY AIR BUBBLES THAT MIGHT BE TRAPPED WITHIN THE HANDPIECE.** To change inserts, simply pull out one and replace with another, making certain that it is fully seated.



FIGURE 2. PLACING INSERT INTO HANDPIECE

CAUTION

If the insert does not readily snap into the handpiece, moisten the "O" ring. (See Figure 3.) DO NOT FORCE into place. Twist the insert as it is pushed into the handpiece.

b. The handpiece, with the insert in place, converts electrical power, supplied by the generator, into microscopically small strokes which activate the insert tip. A continuous flow of water is required to keep the handpiece cool. This same water, warmed within the handpiece, is then delivered through the water outlet to the activated tip.

3. "Thru-Flow"® Inserts

The unit is used with quick-change interchangeable inserts designed to provide ready access to all areas of the mouth. The unit accepts all Cavitron 30K inserts.

Cavitron 30K INSERT COMPONENTS: The 30K insert is made up of the following components:

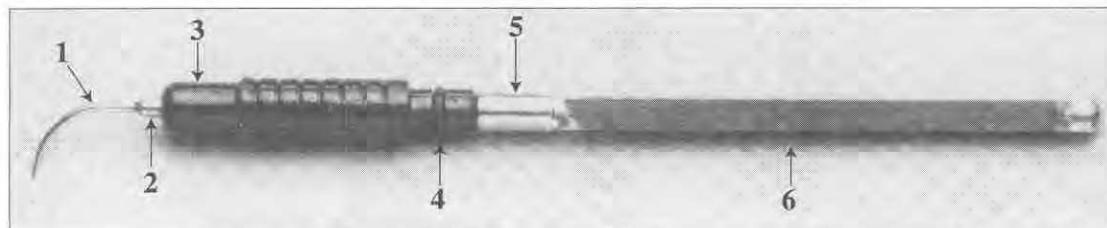
a. Insert Tip (1).

- b. Water outlet (2) for delivering preheated water to the activated tip. The insert's design ultrasonically transports lavage water along the entire working length of the tip.
- c. Plastic Grip (3).
- d. O-Ring (4) which acts as a water seal when the insert is placed into the open end of the handpiece.
- e. Connecting body (5) which transmits motion from the stack to the insert tip.
- f. Magnetostrictive Stack (6) which converts electrical power supplied to the handpiece into mechanical oscillations used to activate the insert tip.

4. Foot Control

The handpiece is operated by an on-off contact foot switch which functions as follows:

- a. With the foot held down on foot control pedal, the handpiece is activated and water flows.
- b. With foot removed from pedal, both handpiece and water flow are shut off.



- 1. Insert Tip
- 2. Water Outlet
- 3. Plastic Grip
- 4. O-Ring
- 5. Connecting Body
- 6. Magnetostrictive Stack

FIGURE 3. CAVITRON "THRU-FLOW"® INSERT COMPONENTS

SECTION II – Installation

1. Electrical Requirements

A 3-prong type grounded wall outlet is required, supplying 115 volts, 50/60 Hertz AC current. Grounding reliability can only be achieved when the unit is connected to an equivalent receptacle marked "hospital only or hospital grade." DO NOT REMOVE GROUND LUG FROM PLUG.

2. Installation

On receipt of equipment, unpack carefully. Check that the ON-OFF Pushbutton (Figure 1) is in the "OFF" (out) position and complete the installation.

3. Power Cable

On all units the power cable is already attached to the unit.

All 100-115V units contain a 3-prong plug on the end of the power cable. The plug on all 220-240 volt units around the world will contain two prongs.

Check that the ON-OFF Pushbutton is in the "OFF" (out) position, then insert plug into wall outlet.

4. Foot Control

Insert the connector of foot control cable into 3-hole receptacle on rear panel of cabinet. The 100-115 volt models have a 3-pin plug. All other 220-240 volt units around the world have a 2-pin plug.

5. Water Supply

One end of the water supply hose is attached to the unit at the factory. The water supply to the unit should be limited to 25 psi minimum and 60 psi maximum pressure. It is recommended that a manual shut-off be installed in the water line to the unit so the water can be completely shut off when the office is unoccupied. Attaching the water hose from the unit to this line is accomplished using an adapter suitable for the installation. NOTE: A strainer is recommended for installation in the

water supply to the unit. Immediately after the adapter is connected to the line, flush the adapter fitting of any debris created by the connection. With the adapter fitting flushed, connect the free end of the supply hose to the adapter fitting. Test the connection to make sure it is tight. If incoming water pressure is above 60 psi install a water pressure regulator in the main water supply line.

6. Handpiece (Original)

The handpiece and cable assembly is attached to the unit.

7. Steri-Mate™ Handpiece

The Steri-Mate Handpiece accepts all Dentsply Cavitron 30K Ultrasonic Scaling Inserts and the 30K-PEC Ultrasonic Endodontic Insert. The handpiece assembly consists of two sections: 1) the Steri-Mate Handpiece, and 2) Handpiece Connector and cable assembly. The Steri-Mate Handpiece is fully detachable and sterilizable using any currently available steam, dry heat or chemical vapor sterilizer. To detach the Steri-Mate Handpiece, grip the Connector in one hand and the Handpiece in the other and pull the assembly straight apart. To reassemble, align the fittings on the Connector with the ports in the Handpiece and push straight in until the two sections snap together. Do not twist or bend either section during disassembly or reassembly as damage to the fittings may result.

8. Dentsply® Cavitron® 30K™ Ultrasonic Inserts

The many styles of Cavitron 30K ultrasonic inserts are easily interchangeable for various procedures and applications. Fully seat inserts into the handpiece body with a gentle push-twist motion. Do not force into place. Wetting the o-ring on the insert with water facilitates insertion and protects the o-ring from damage. To remove an insert simply pull and twist it out from the handpiece.

SECTION III – Post-Installation Check

1. Electrical

Check to make sure that the Slo Blo fuse cap on the bottom of cabinet is securely locked in place. Actuate the ON-OFF pushbutton to "ON." The "ON" indicator will light.

2. Foot Control

Place a Cavitron TFI 30K-10 insert into handpiece. Set the Power Adjustment Dial at either Medium or High, then check the functioning of control as follows:

- a. Step on foot control. Insert should become activated and water should flow from insert water outlet. If no water flows from water outlet, turn Water Flow Adjustment Knob (see Figure 1) in a clockwise direction until water flow begins.
- b. Release foot control. Both handpiece operation and water flow should stop.

3. Water Flow and Adjustment

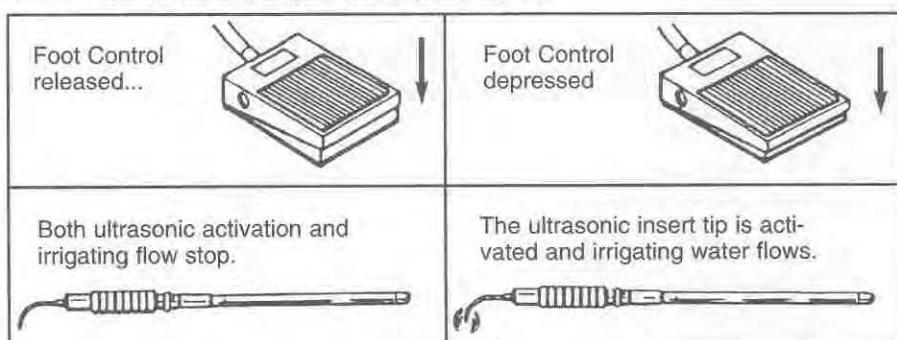
The Water Flow Adjustment Knob regulates the volume of water and therefore the temperature of the water flowing from the insert water outlet.

Adjusting Water Flow. With the Power Adjustment Dial set to either Low, Medium or High, step on foot control and adjust the volume of water flowing from the handpiece water outlet as follows:

- a. To increase water flow, turn Water Flow Adjustment Knob in a clockwise direction until the desired rate of flow is obtained. At least 35cc of water per minute is needed to keep the handpiece cool.
- b. To decrease flow, turn Water Flow Adjustment Knob in a counterclockwise direction until the desired rate of flow is obtained.
- c. Increasing the power level will cause the water in the handpiece to heat faster, which reducing the power level will cause the water to heat at a slower rate.

The Foot Control is a single-position momentary switch, which activates both ultrasonic energy and Lavage Flow at the insert tip.

FIGURE 1. FOOT CONTROL INFORMATION & OPERATION



NOTE

The operator should bleed any air from the handpiece that may become trapped by holding the empty handpiece vertically over a suitable drain, activating the foot control and allowing the water to fill the handpiece. Place the Cavitron insert into the handpiece. **WITH THE INSERT IN PLACE, HOLD HANDPIECE IN AN UPRIGHT POSITION. ACTIVATE THE INSERT TO BLEED ANY AIR BUBBLES THAT MIGHT BE TRAPPED WITHIN THE HANDPIECE.** This procedure should be repeated each time an insert is placed into the handpiece. Trapped air does not interfere with the handpiece operation, but could cause excessive heating.

CAUTIONS

In order to reduce bacteria that may have accumulated in the instrument overnight, the water line should be flushed daily prior to use. To flush, remove insert, set water flow to maximum and depress foot switch for 2 minutes. Replace insert.

Whenever the insert tip is placed within the patient's mouth, the lip should be retracted to prevent contact with the insert tip.

Inserts should be replaced after one year's usage in order to maximize cleaning efficiency and avoid breakage. Efficiency Indicators, Form Nos. 80440 and 80441, are available from DENTSPLY to measure the wear on Cavitron insert tips. Insert tips that have been bent, scratched or dropped should be discarded immediately to avoid breakage.

NOTE

Prior to use on each patient it is recommended that the handpiece tip be flushed by holding it over a suitable drain and activating the foot control for 30 seconds.

SECTION IV – Infection Control Information

CAVITRON 3000 ULTRASONIC SCALER

The objective of this information is to supplement published general guidelines for reducing cross contamination of infectious diseases when using a DENTSPLY® Cavitron® 3000 Ultrasonic Scaler during routine dental care. In the event any regulatory agency disagrees with this information, the agency requirements take precedence.

The control of infection is accomplished by combining the techniques of cleaning, disinfecting and sterilizing. The methods selected should consider both the destruction of the harmful microorganisms and the effect on the materials of construction. The outer surfaces of the DENTSPLY® Cavitron 3000 Ultrasonic scaler, consisting of the cabinet, power line cord, Handpiece and cable assembly, Foot control and cable assembly should be cleaned and disinfected. Scalers with detachable handpieces (Steri-Mate™ along with ultrasonic inserts require cleaning and sterilization. Preferred methods are discussed. However, alternatives are available. Special steps may be required when following an alternate method.

Cavitron® Steri-Mate™ Handpiece Sterilization

CLEANING

Gross debris can be removed by carefully scrubbing the handpiece with an autoclavable brush and non-ionic multi-purpose cleaner. Dry completely with an air syringe or clean paper towel.

STERILIZING

1. Place Handpiece(s) in a paper or paper/plastic steam sterilization pouch. Place the paper side up when using a paper/plastic sterilization pouch.
2. Place the bagged Handpiece(s) into the steam autoclave. After warm-up is completed, operate at a sterilization temperature and pressure of 273°F/31 psi (134°C/216 kPa) for 12 minutes, followed by a 20 - 30 minute drying time.
3. To maintain sterility, store the Handpiece(s) in the bag until they are to be used.

- Steam autoclaving is the preferred sterilization method, and maximum life is assured with this method.
- Dry heat sterilization and chemical vapor sterilization are good alternatives.
- All other sterilization methods may adversely affect handpiece and will void the warranty.

CAUTION

- Chemical solution asepsis is usually reserved for disinfection purposes as it is not considered an acceptable substitute for heat sterilization. If selected, care must be taken to obtain assurance from the solution manufacturer that the chemical ingredients in the solution will not harm plastic, elastomeric or metal materials when used at sterilization strength and time.
- Select only one sterilization method and continue to use the same method for repeated sterilization.
- Do not use chemical disinfectants prior to sterilization or rapid deterioration of the materials may occur.

Recommended Daily Maintenance

BEGINNING OF THE DAY

Hold the Handpiece over a sink or drain, set power to low, activate the foot control and flush the water line of the unit at maximum water flow for at least 2 minutes.

Place a freshly sterilized insert into the Handpiece. The unit is now ready for operation.

BETWEEN PATIENTS

1. Remove all ultrasonic inserts and Steri-Mate™ Handpiece used, clean and sterilize.
2. Clean and disinfect the surfaces of the cabinet, Power Cord, Handpiece and cable assembly, Foot control and cable assembly by applying an approved non-immersion type disinfectant solution* carefully following the instructions provided by the disinfectant solution manufacturer.
- To clean the system, generously spray disinfectant solution on a clean towel and wipe all surfaces. Discard used towel.
- To disinfect the system, generously spray disinfectant solution on a clean towel and wipe all surfaces. Allow disinfectant solution to air dry.
3. Connect a freshly sterilized Steri-Mate™ handpiece to its matching cable connector. Hold the Handpiece over a sink or drain and flush the water line of the unit as above at maximum water flow for 30 seconds.
4. Place a freshly sterilized 30K™ Cavitron® ultrasonic insert into the handpiece.

NOTE

*Water-based disinfecting solution are preferred. Some alcohol-based disinfectant solutions may be harmful and may discolor the plastic cabinet materials.

5. If the Cavitron® 3000 scaler is used with a closed water supply or a DualSelect™ dispenser, check for adequate fluid volume for the patient scheduled for treatment next.

SHUT-DOWN PROCEDURE AT THE END OF THE DAY

1. Remove all ultrasonic inserts and Steri-Mate™ handpiece used, clean and sterilize.
2. Clean and disinfect the surfaces of the cabinet, Power cord, Handpiece and cable assembly, Foot control and cable assembly by applying an approved non-immersion type disinfectant solution* carefully following the instructions provided by the disinfectant solution manufacturer.

To clean the system, generously spray disinfectant solution on a clean towel and wipe all surfaces. Discard the towel.

To disinfect the system, generously spray disinfectant on a clean towel and wipe all surfaces. Allow disinfectant solution to air dry.

ULTRASONIC INSERT STERILIZATION

The cleaning and sterilization procedures for all DENTSPLY® Cavitron® ultrasonic Inserts are described in the Infection Control Information sheet packaged with DENTSPLY® Cavitron® Inserts (Form No. 79457). Copies are available by contacting the Technical Support number listed.

CLEANING/DISINFECTING

If necessary, prior to sterilization, rinse Cavitron® Inserts under water to remove any gross debris. The use of cleaning and disinfectant solutions, such as ultrasonic cleaning solutions, are not recommended.

STERILIZATION

Bagged Inserts

1. Place inserts in a paper or paper/plastic steam sterilization pouch. Place the paper side up when using a paper/plastic sterilization pouch.
2. Place the bagged insert into the steam autoclave. After warm-up is completed, operate at a sterilization temperature and pressure of 273°F/31 psi (134°C/216 kPa) for 12 minutes, followed by a 20-30 minute drying time.
3. To maintain sterility, the insert should remain in the sealed pouch until it is read for use.

Unbagged Inserts

After warm up is completed, steam autoclave unbagged Cavitron® Inserts at a sterilizing temperature and pressure of 273° F/31 psi (134°C/216 kPa) for 3 minutes, followed by a 20-30 minute drying time. Use the insert immediately.

O-Rings

Before placing Cavitron® Inserts into the Handpiece, performing the following steps will increase the o-ring life on Cavitron® Inserts:

1. Fill entire Handpiece with water,
2. Lubricate o-ring (black or green rubber material) with water.
3. Gently twist the insert down into the Handpiece until the insert is fully seated in place.

SECTION V – Service and Repair

The Dentsply/Cavitron Model 3000 Ultrasonic Dental Unit requires little or no service. If service should be necessary, the following measures will eliminate most difficulties you may encounter. Where more than one corrective measure is shown, follow the indicated sequence. If the corrective measures fail, the unit should be returned to Dentsply Professional for service.

TROUBLESHOOTING AND ANALYSIS

SYMPTOMS	CAUSES	CORRECTIVE MEASURES
Water drip from handpiece when unit not operating.	Water solenoid valve (SV1) open.	Repair or replace solenoid valve.
Loud hum from generator.	Air trapped in water regulator (WR1).	1. Tilt unit at different angles with handpiece activated. 2. If problem persists, replace regulator.
	High water pressure.	Install water pressure regulator on main water supply line and reduce pressure to 60 psi.
Insert does not vibrate, but the water flow is normal	The insert is defective.	Check the insert for visible wear and damage. Check the insert manufacturing date code; (YYMM) and replace with a new Cavitron® insert.
	The Steri-Mate™ handpiece is defective from wear or improper sterilization.	Check Steri-Mate™ handpiece manufacturing date code; (MMY Rev.) replace the Steri-Mate™ handpiece and test the unit operation.
Insert stops vibrating when coming in contact with tooth.	Insert malfunction.	Test with another insert. If test insert works properly, original insert is damaged.
	Insert not pushed in far enough for automatic pick-up	Check if insert seats in handpiece.
	Malfunction of handpiece assembly.	Check continuity of handpiece lines. Refer to schematic, Figure 6 or 7 as applicable. 1. Connect ohmmeter between terminal TP1 and TP3. 2. Connect ohmmeter between TP2 and TP3. Flex handpiece line and check for intermittent reading. *If ohmmeter reading is not constant or not reading, handpiece and cable assembly is likely to be damaged and should be repaired.
	Loose wiring or defective solder joint in unit wiring.	Visual check of all unit wiring.
Insufficient water from unit.	Low water pressure.	Remove water control knob from front panel and adjustment water flow upward.
Slo Blo fuse F1 fails.	Short or failure within unit.	Unplug transformer (T1) secondary cable from the interconnect board. 1. Fuse still blows. Check for short circuit in ON/OFF switch and/or transformer. 2. Fuse does not blow. See "Troubleshooting Oscillator Module."

SYMPTOMS	CAUSES	CORRECTIVE MEASURES
Slo Blo Fuse F1 good. No power to circuitry. Thermal cutout built into transformer opens.	Unit is installed in a confined area (such as a cabinet), or is too close to heat source to insure proper air circulation around unit.	Provide adequate air circulation around unit.
No power to unit.	Faulty wall outlet or unit cord.	1. Check wall outlet and if faulty take necessary corrective measures. 2. Check unit cord from unit to outlet. Replace if damaged.
	Fuse F1 blown.	Replace fuse F1 or fuse assy.
	Damaged ON/OFF switch.	Replace ON/OFF switch (S1).
Continuous clicking or no click at all when stepping on foot switch.	Damaged foot switch.	Check foot switch by removing foot control plug from rear of the unit. If defective, repair or replace.
Handpiece heats up.	Insufficient water to cool handpiece.	Turn water adjustment knob clockwise until handpiece runs cool.
	Air trapped in handpiece.	When inserts are changed, hold the handpiece in an upright position until trapped air is removed and water flows properly.
Water spray from insert not properly covering operating area of activated insert tip	Improper water flow adjustment	Refer to "Instructions For Using Dentsply®/Cavitron® Ultrasonic Dental Unit" (Dentists' Manual), for instructions on water flow adjustment.
Water leak from handpiece when in operation	O-ring on insert worn.	Replace the O-ring.
	The Steri-mate™ handpiece cable o-ring is worn or damaged.	Replace the HP cable o-ring. Part No. 628050001.
	Water leak in plastic water line at handpiece or within the unit.	Replace the handpiece and cable assembly.
Insert vibrates but no water, or insufficient water volume flows from handpiece	Faulty water supply to unit.	Check water supply line to unit and take necessary action to insure volume.
	Damaged water regulator.	Replace water regulator.
	Obstruction or mineral deposits in water system in unit.	1. Remove insert and turn water valve full open. Observe water flow. If flow is good then obstruction is in insert. Replace insert. 2. If obstruction is not in insert, then remove handpiece water line at solenoid and check water flow. If flow is good then obstruction is in handpiece supply line. Replace handpiece and cable assembly.

SYMPTOMS	CAUSES	CORRECTIVE MEASURES
Water flow not controllable by turning water adjustment knob.	Malfunction of water regulator.	Replace water regulator.
Inserts do not fit handpiece properly.	"O" Ring on insert dry.	Lubricate "O" Ring with water. Replace if worn.

TROUBLESHOOTING THE OSCILLATOR MODULE

Slo Blo fuse (F1) blows.	Faulty component CR1, C1, C2	Unplug handpiece cable J2 from oscillator module. Note: Transformer secondary cable is plugged into interconnect board. Fuse blows – Remove oscillator module. Check for shorted power supply.
	Faulty component Q2, Q1.	Fuse does not blow – Check output transistor. Check predriver.
Very low level oscillations or no oscillations. No water.	Open handpiece	Remove and repair handpiece.
	Open solenoid	Check for proper resistance at PCB (28 ohms)
Normal oscillation No water.	CR2 shorted	Replace commutating diode.
Unit activates when AC power is applied.	Shorted footswitch	Check footswitch for short circuit. Replace if faulty.
	Transistor (Q1) on interconnect P.C. board faulty.	Check predriver. Replace if faulty.
Weak or no oscillations. Water Flow normal.	Faulty insert.	Replace insert.
	Hybrid assembly faulty.	Check test point 6 on hybrid assembly. <ul style="list-style-type: none">• Checks good: Refer to Tuning Procedure.• Checks bad: Replace hybrid.

TUNING PROCEDURE

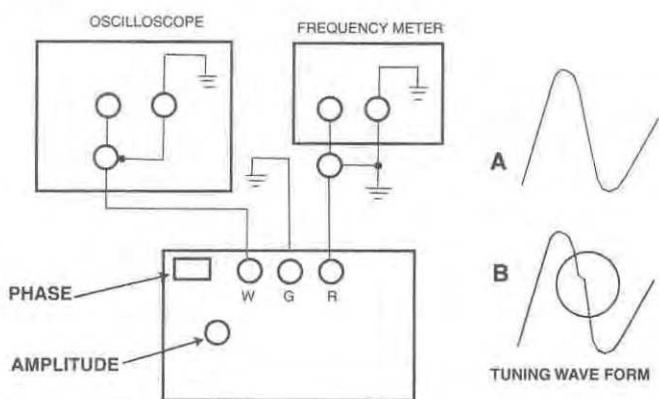
CAUTION

Tuning systems by any other method could result in malfunction of the automatic mode selection circuits and severely reduced operating efficiency.

1. TEST EQUIPMENT REQUIRED

- a. Frequency meter
(1 Hz resolution). } 10 Meg Isolation,
20 pf max.
- b. Oscilloscope.
- c. High Z voltmeter (> 1 meg/volt).

2. SET-UP



3. PROCEDURE USING 30K RESONATOR INSERT

- a. Connect test equipment as shown above.
- b. Apply rated AC power to the unit. DO NOT DEPRESS FOOTSWITCH.
- c. Adjust the front panel POWER control to maximum.
- d. Install a 30K tuning resonator insert (or 30K-3 insert) in the handpiece.
- e. Adjust water control to mid-position.
- f. Set the AMPLITUDE control to mid position.
- g. Depress footswitch and bleed any air out of the handpiece.
- h. While observing the scope, adjust the PHASE control to obtain maximum amplitude.
- i. The waveform should appear as in "A"

above.

- j. Adjust the AMPLITUDE control counter-clockwise to obtain waveform "B" above.
- k. Set front panel POWER control to minimum.
- l. Apply load to the insert tip and check for stalling.
- m. If the oscillator stalls, readjust the PHASE control.
- n. The final waveform must be as shown in "B" above.

TEST POINT VALUES MODELS 3000 GENERATOR SERIES 110

- 1. Line voltage for all measurements.
 - 100 VAC — G110J
 - 115 VAC — G110 & G110C
 - 220 VAC — G110B
 - 240 VAC — G110A
- 2. 30K-3 insert in handpiece with normal water flow through insert.
- 3. Adjust power control to maximum.
- 4. Connect voltmeter test probes as indicated below.

ULTRASONICS: ON
INSERT USED FOR TEST: 30K-3
POWER: MAXIMUM
LINE: NOMINAL

TEST POINT	NOMINAL	LIMIT
J6-1	50 VPP	—
J6-2	70 VPP	—
J6-3 (REF)	COMMON	
J6-4	15 V.DC.	14.25-15.75
J6-5	28 V.DC.	26-30
J6-6	7.5 VPP	6-8 VPP
J6-6	2 VRMS	1.5-2.5 VRMS

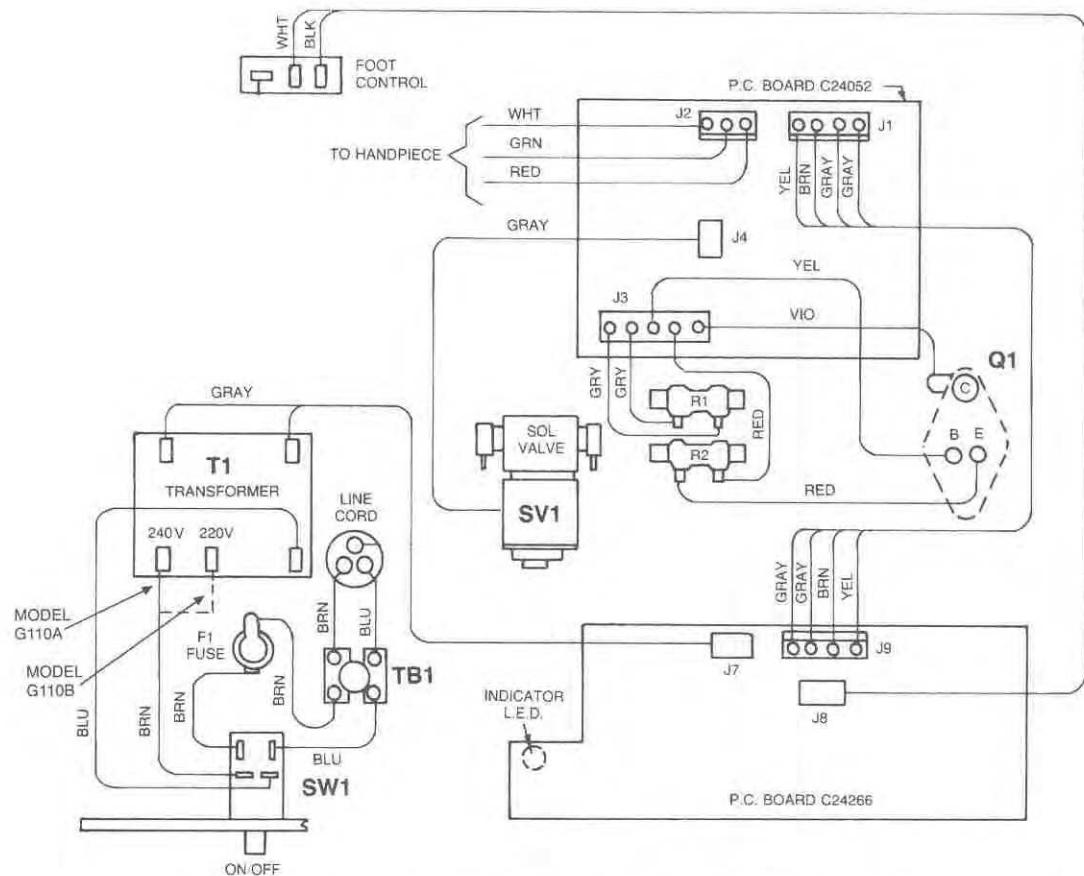


FIGURE 4. WIRING DIAGRAM (MODELS G110A, G110B)

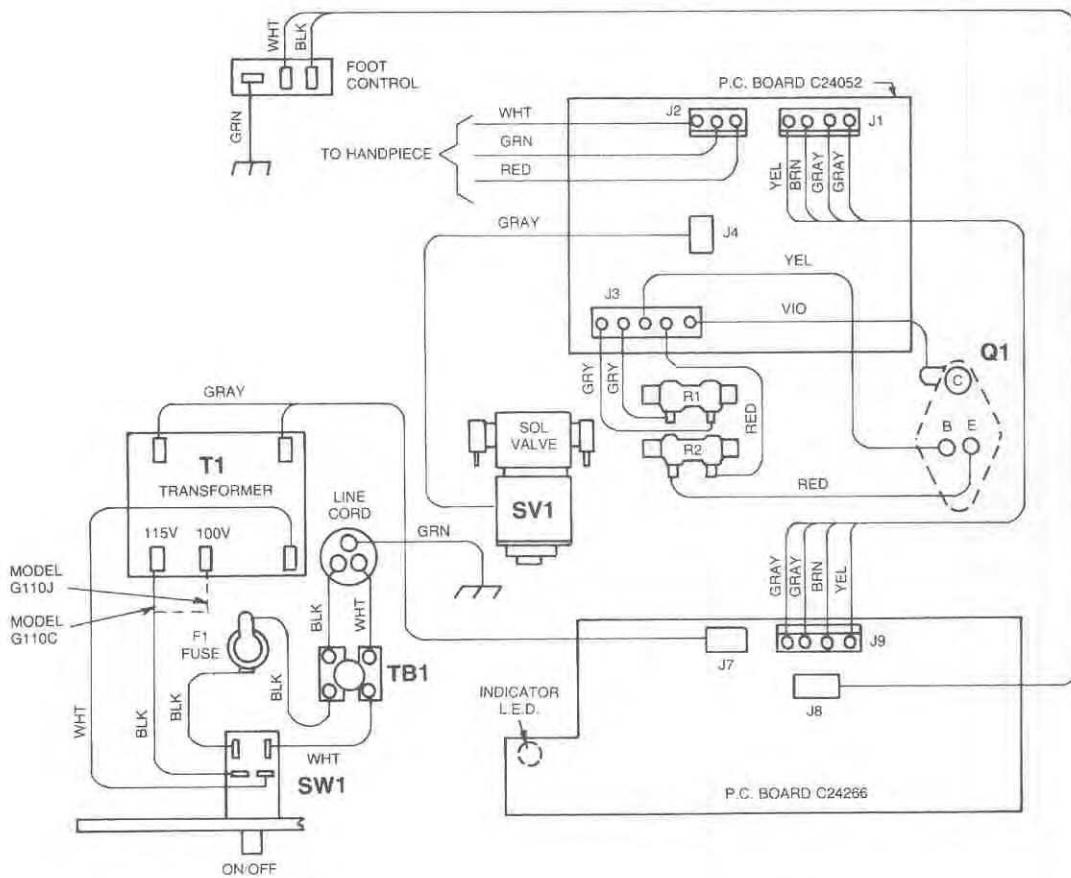


FIGURE 5. WIRING DIAGRAM (MODELS G110, G110C & G110J)

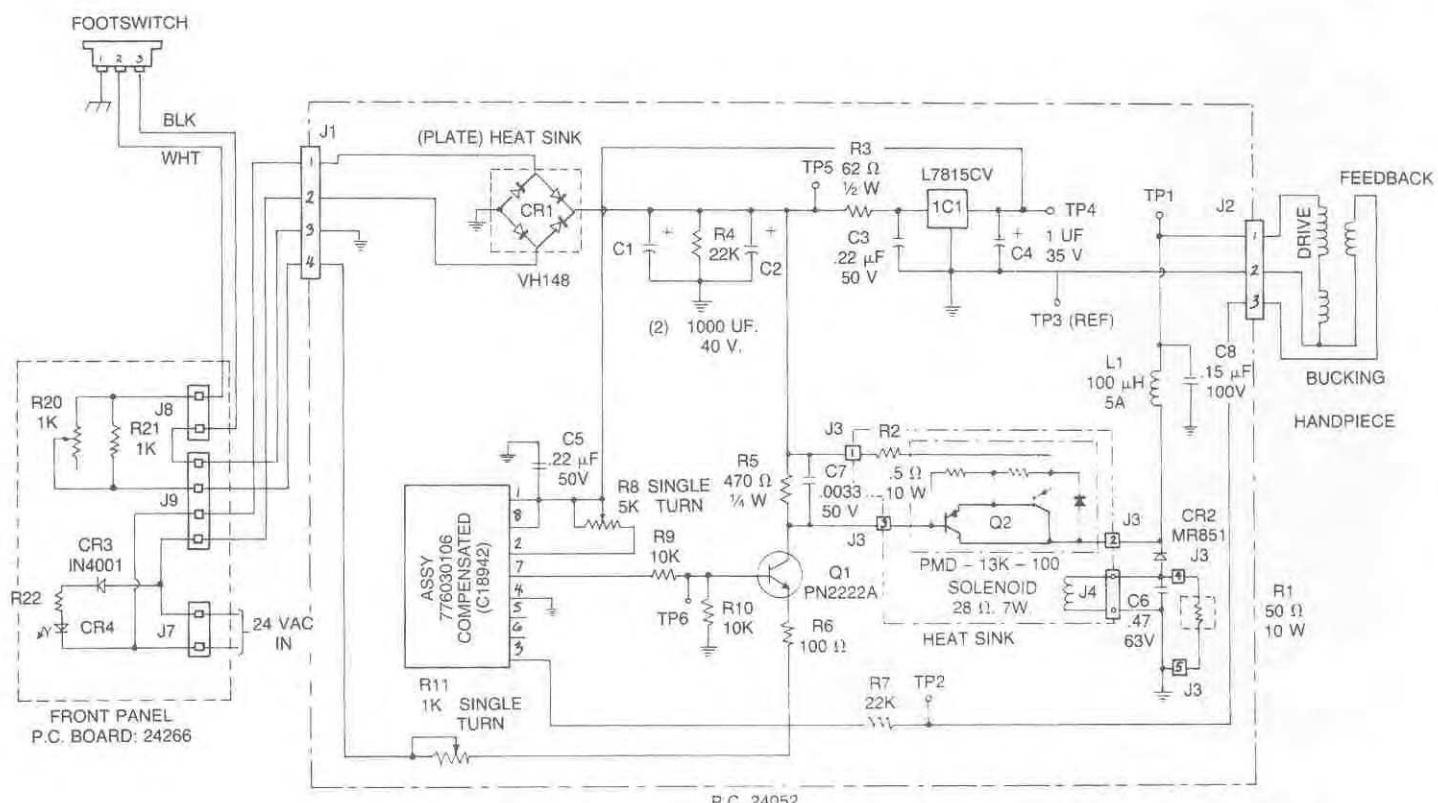
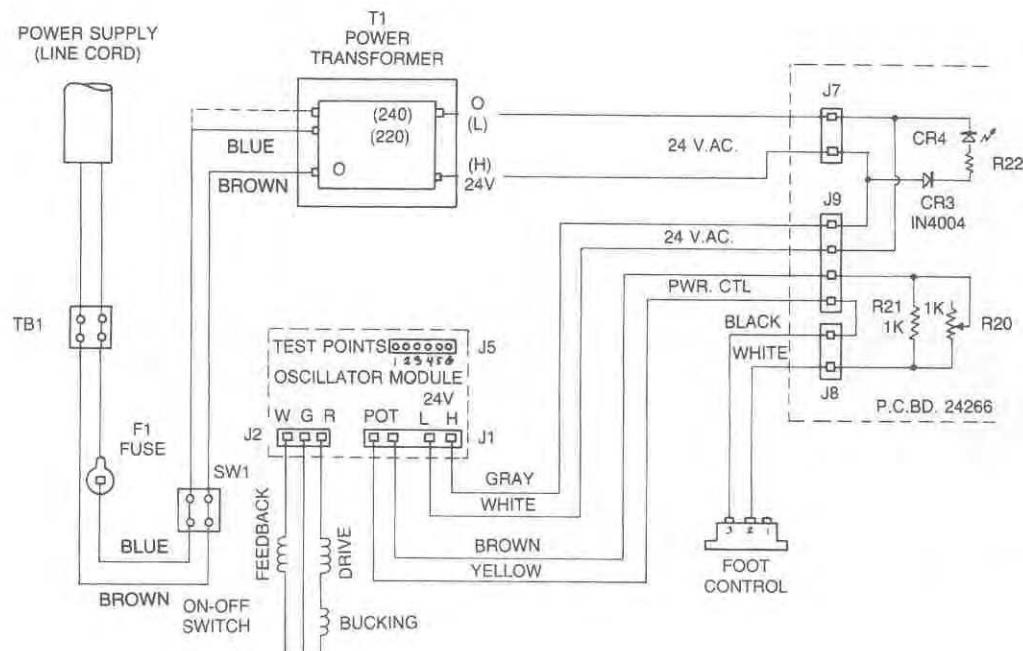


FIGURE 6. ELECTRICAL SCHEMATIC (MODELS G110A, G110B)

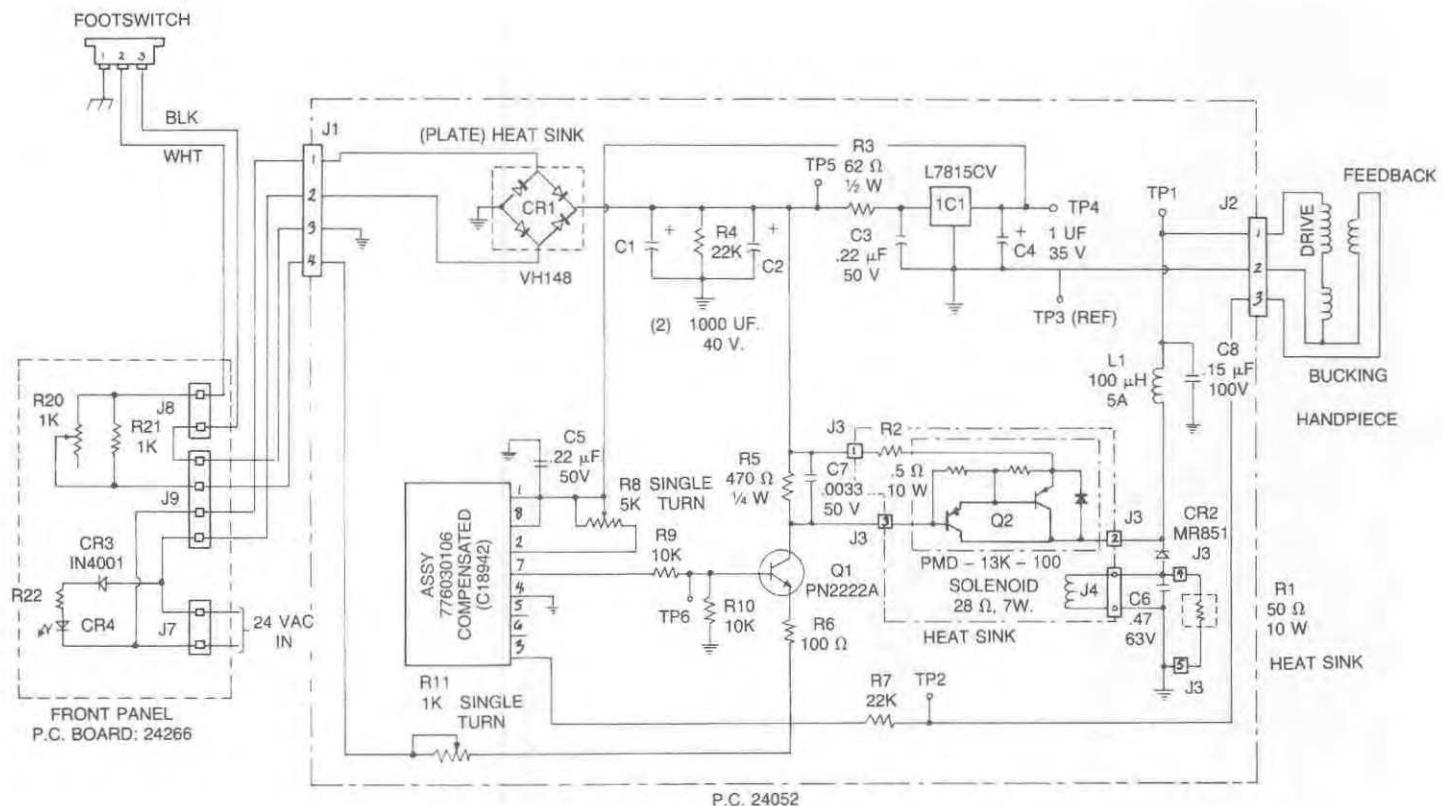
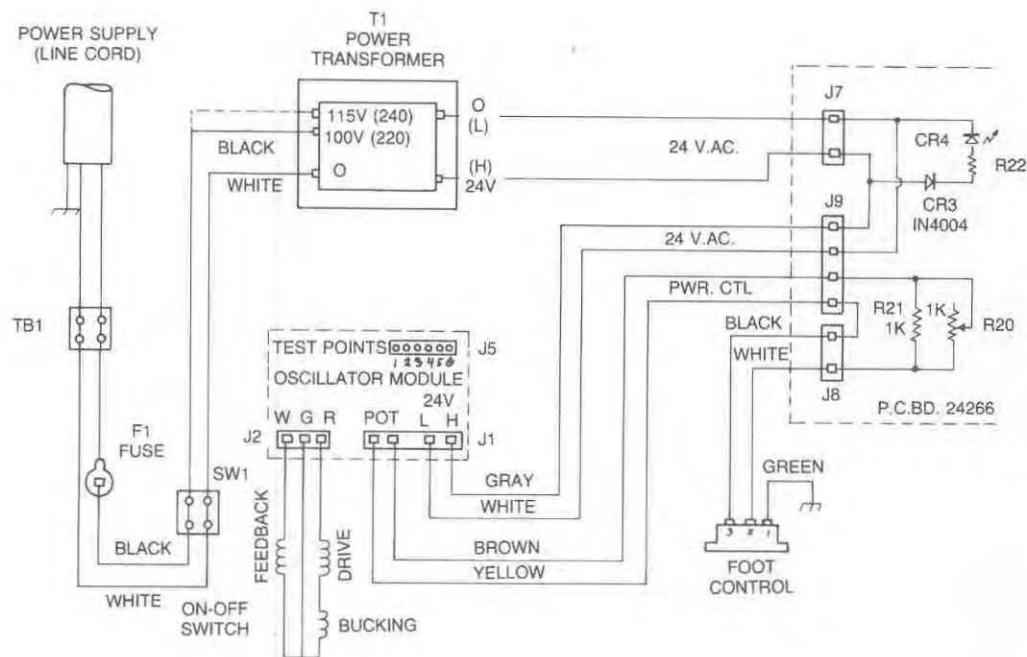
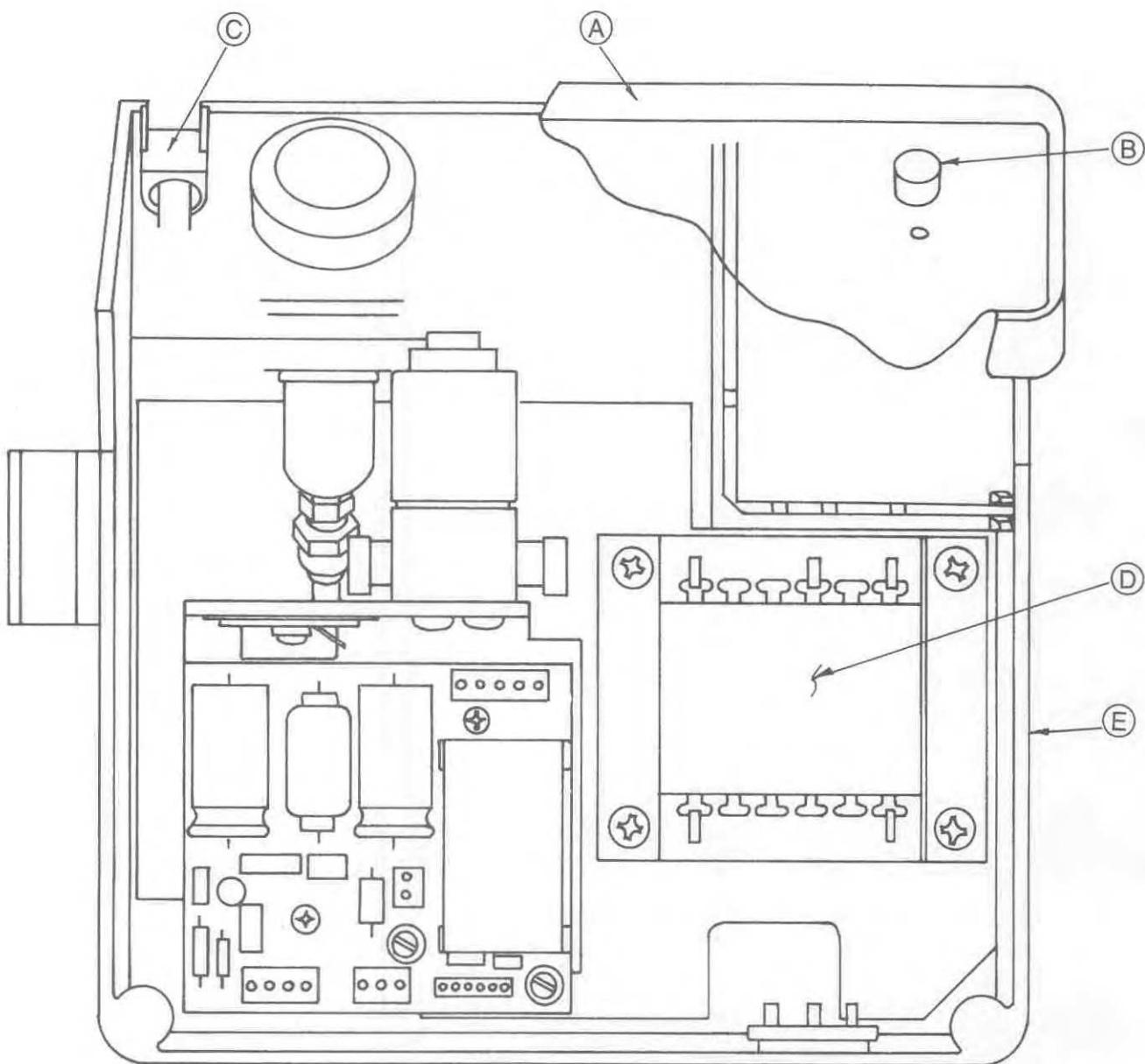


FIGURE 7. ELECTRICAL SCHEMATIC (MODELS G110, G110C & G110J)

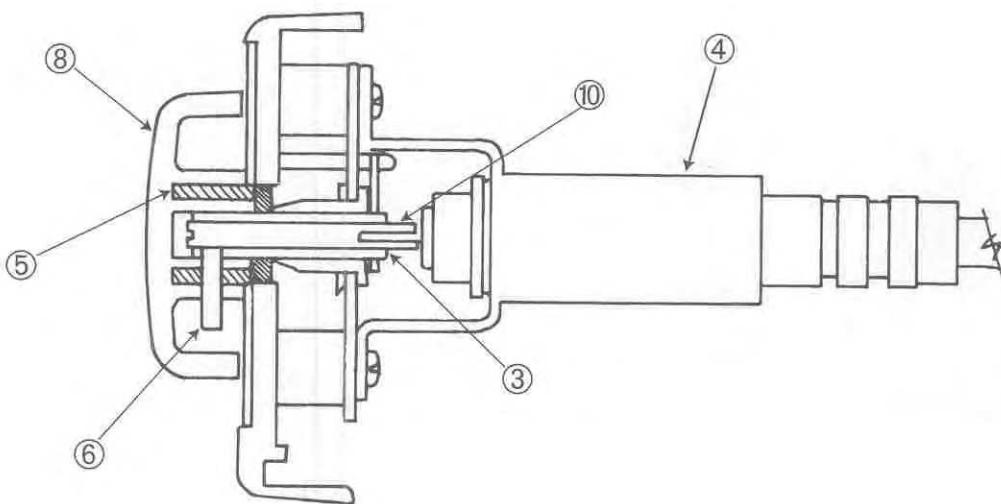
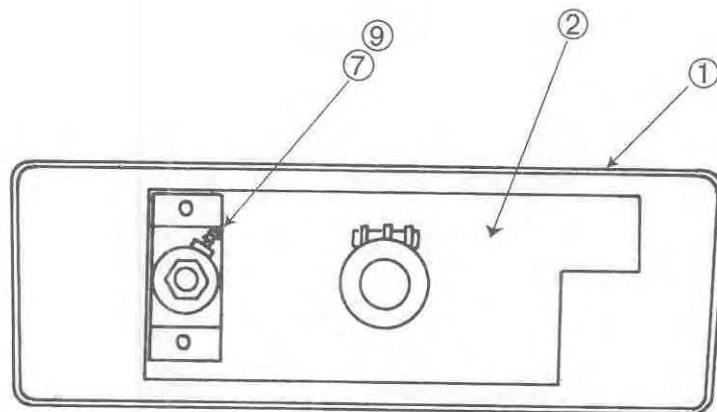


SECTION VI –

Model 3000 Component Assemblies

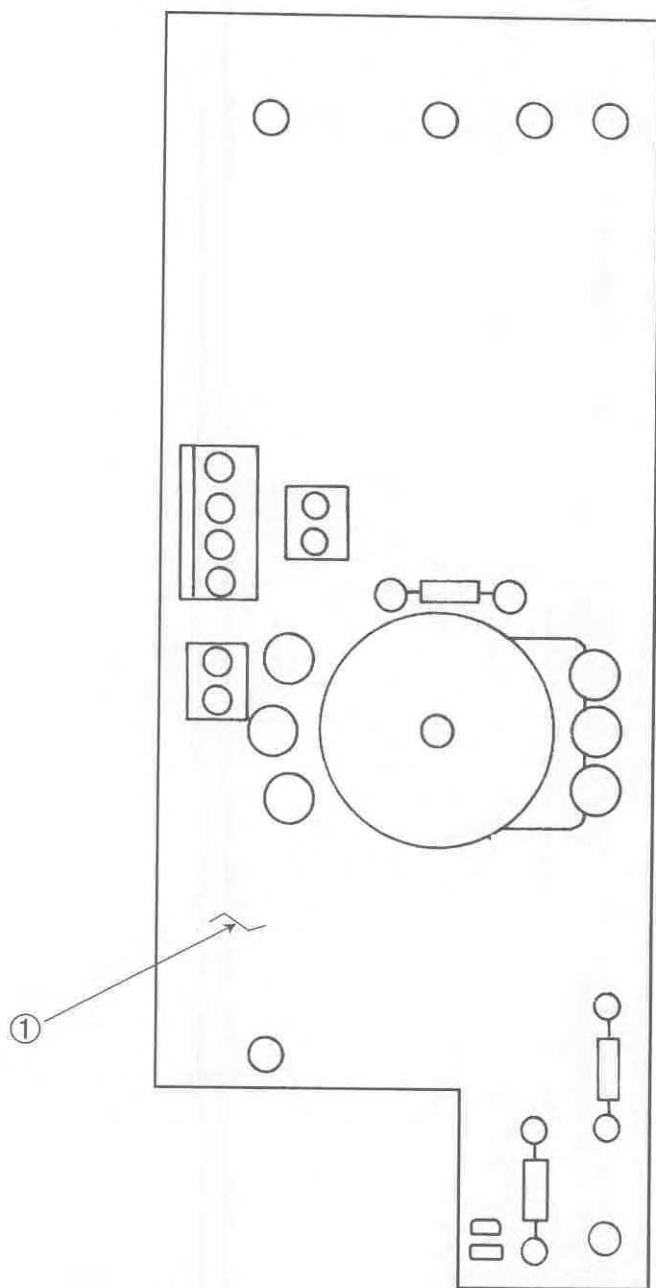
Item	Description	Page
A	Front Panel Assembly	16
B	Pushbutton Switch Assembly	18
C	Handpiece Assembly	19
D	Chassis Assembly	20
E	Cabinet Assembly	23

REF. A1



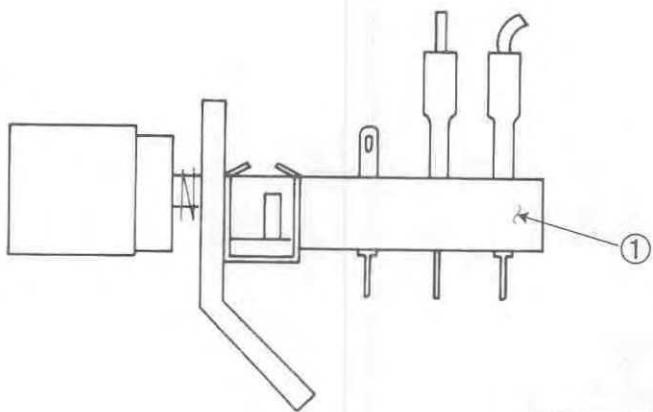
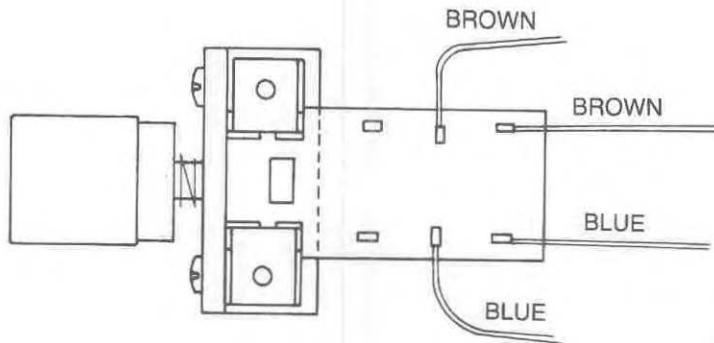
A - FRONT PANEL ASSEMBLY

Item	Qty.	Commodity No.	Description
1	1	77734	Panel w/Inserts, overlay
2	1	776030105	P.C. Board Assy., REF. A1
3	1	776030109	Shaft and Detent Assy.
4	1	79685	Pressure Regulator Replacement Kit
5	2	776030113	Collar
6	4	6390232	Set Screw 4-40 x 3/8
7	1	61679	Fitting, Barbed 10-32 to 1/16 I.D.
8	2	776030116	Knob, Molded
9	1	60386	Gasket, Buna and Fibre
10	1	60412	Shaft Extension

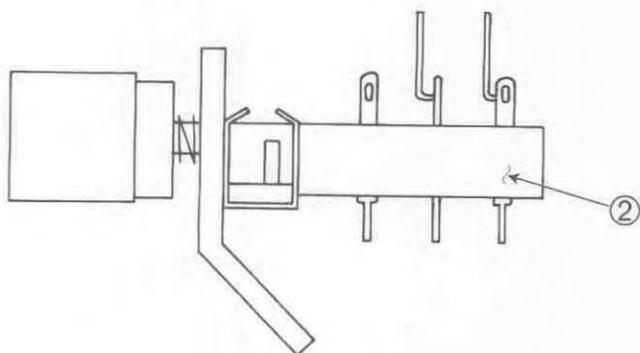
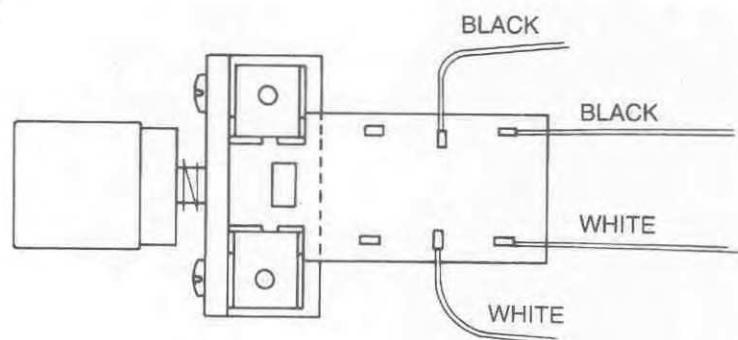


A1– P.C. BOARD ASSEMBLY (Front Panel) G110

Item	Qty.	Commodity No.	Description
1	1	776030105	P.C. Board Assy.



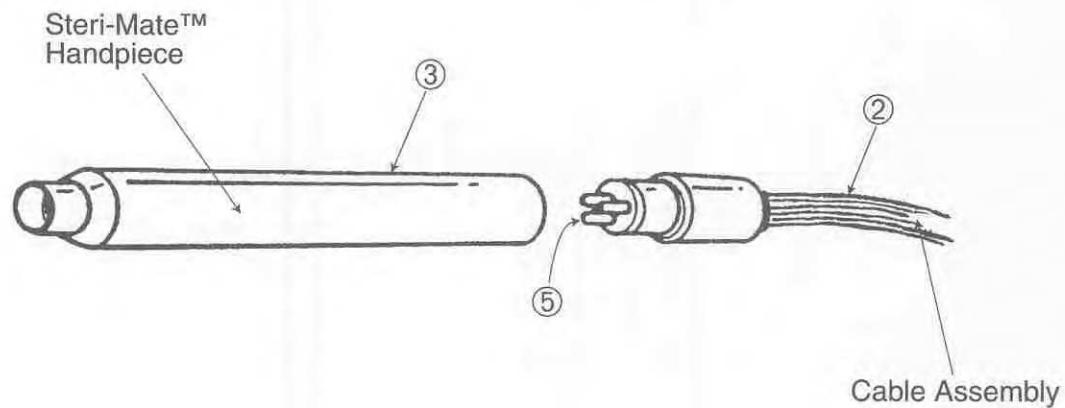
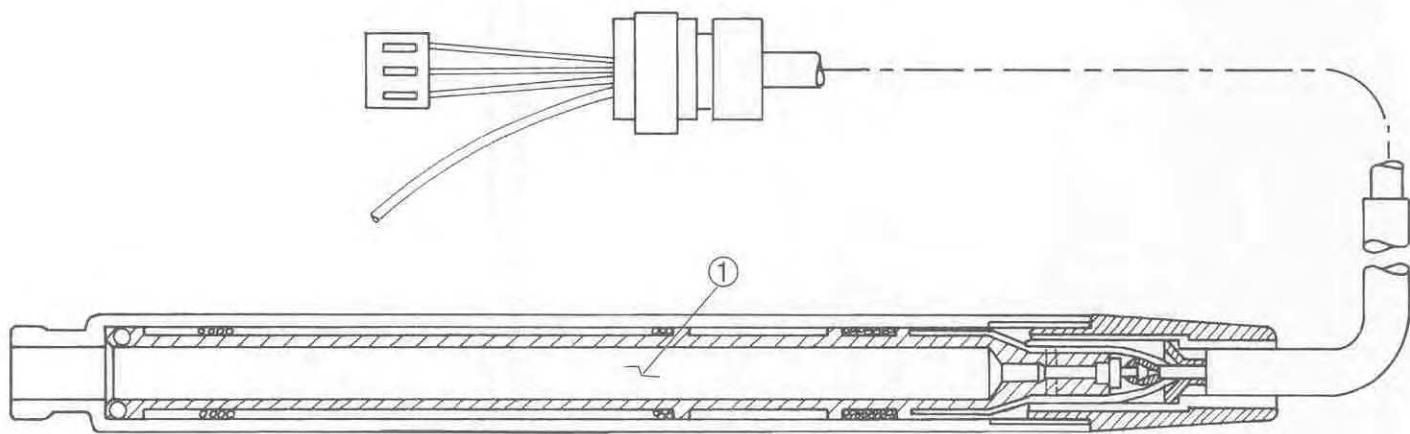
220/240V SWITCH



110/115V SWITCH

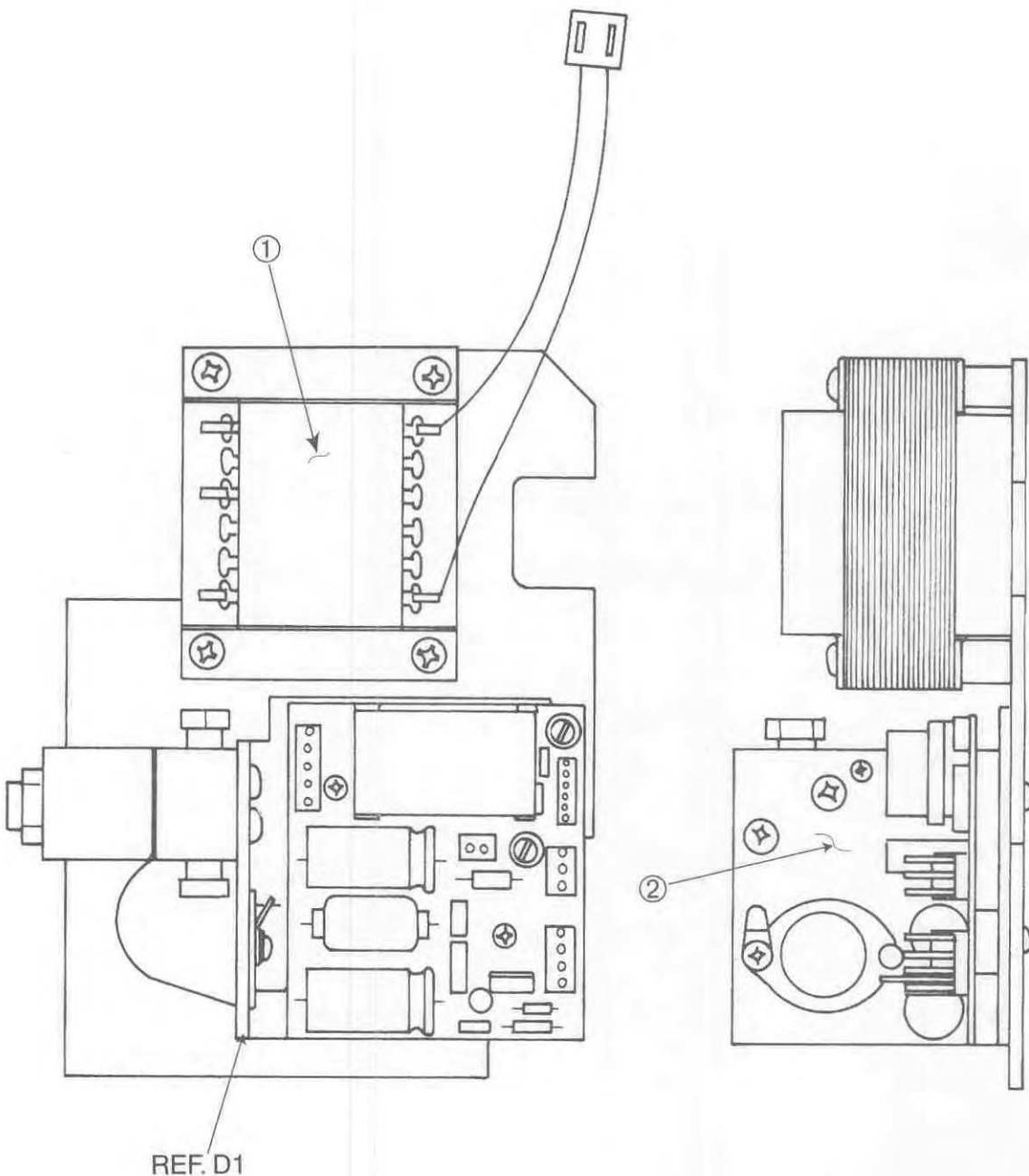
B – PUSHBUTTON SWITCH ASSEMBLY

Item	Qty.	Commodity No.	Description
220V & 240V			
1	1	60534	Switch, Pushbutton, Bracket, Wires
115V			
2	1	60417	Switch, Pushbutton, Bracket, Wires



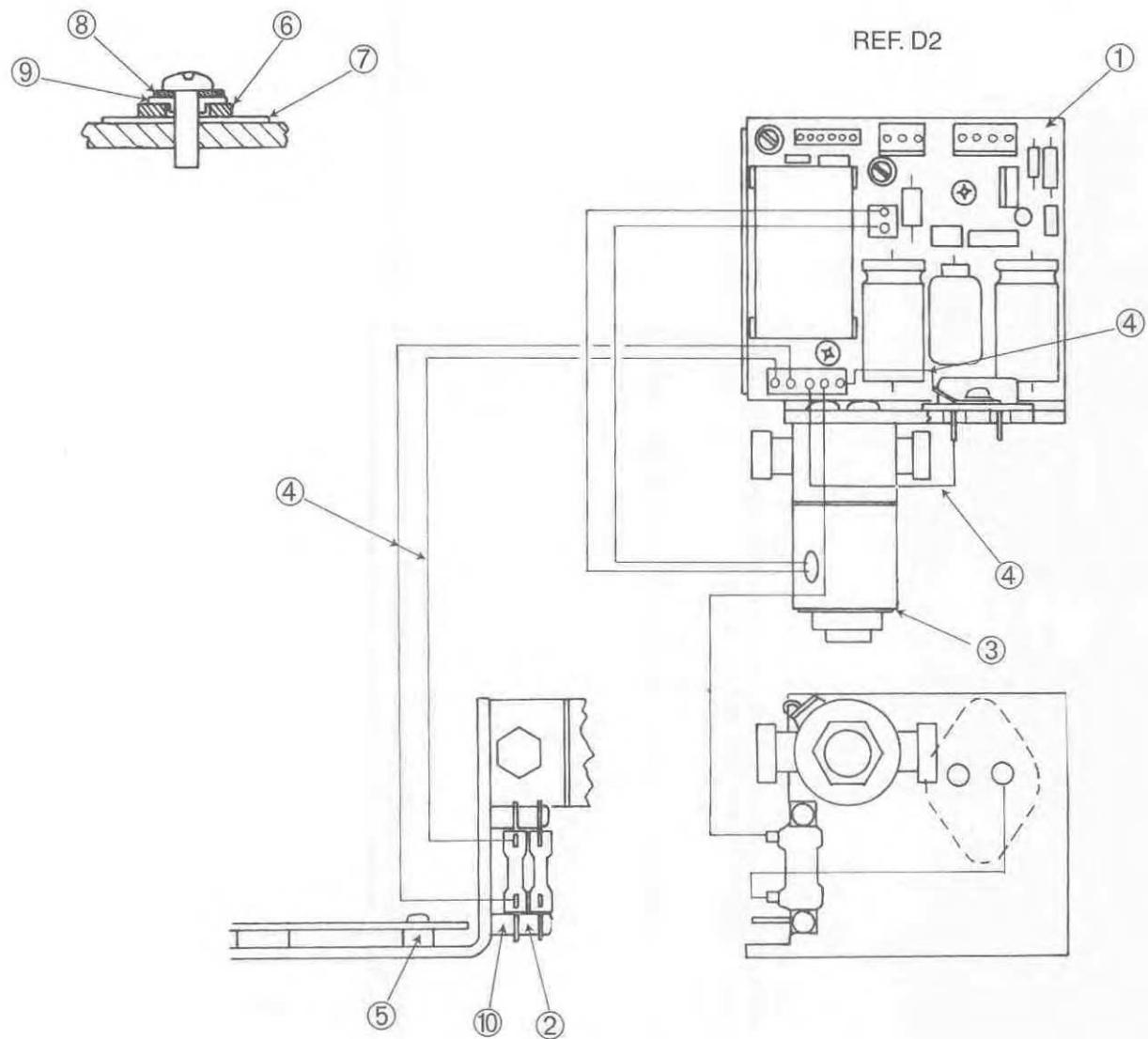
C – HANDPIECE ASSEMBLY

Item	Qty.	Commodity No.	Description
1	1	63737	Handpiece Assy, Non-SteriMate™
2	1	79506	SteriMate™ HP Cable (Early Models)
	1	81285	SteriMate™ Swivel Handpiece Cable
3	1	78688	SteriMate™ Handpiece
4	3	78703	SteriMate™ Handpiece, (3 Pack)
5	1	628050001	SteriMate™ Cable O-Ring
	12	79357	SteriMate™ Cable O-Ring (12 Pack)



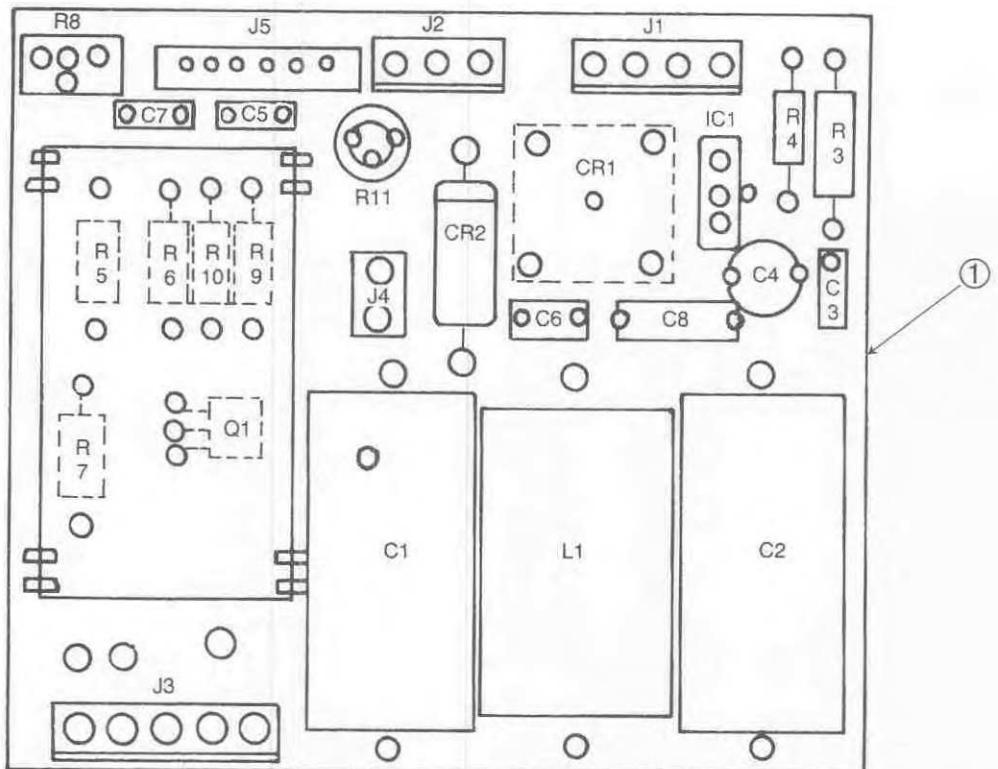
D - CHASSIS ASSEMBLY

Item	Qty.	Commodity No.	Description
1	1	60491	Transformer 110V, 115V
1	1	60535	Transformer 220V, 240V
2	1	776030112	Module Assembly: 30K Osc. PCB, Solenoid Valve, Heatsink, Transistor, Resistors, Tubing.



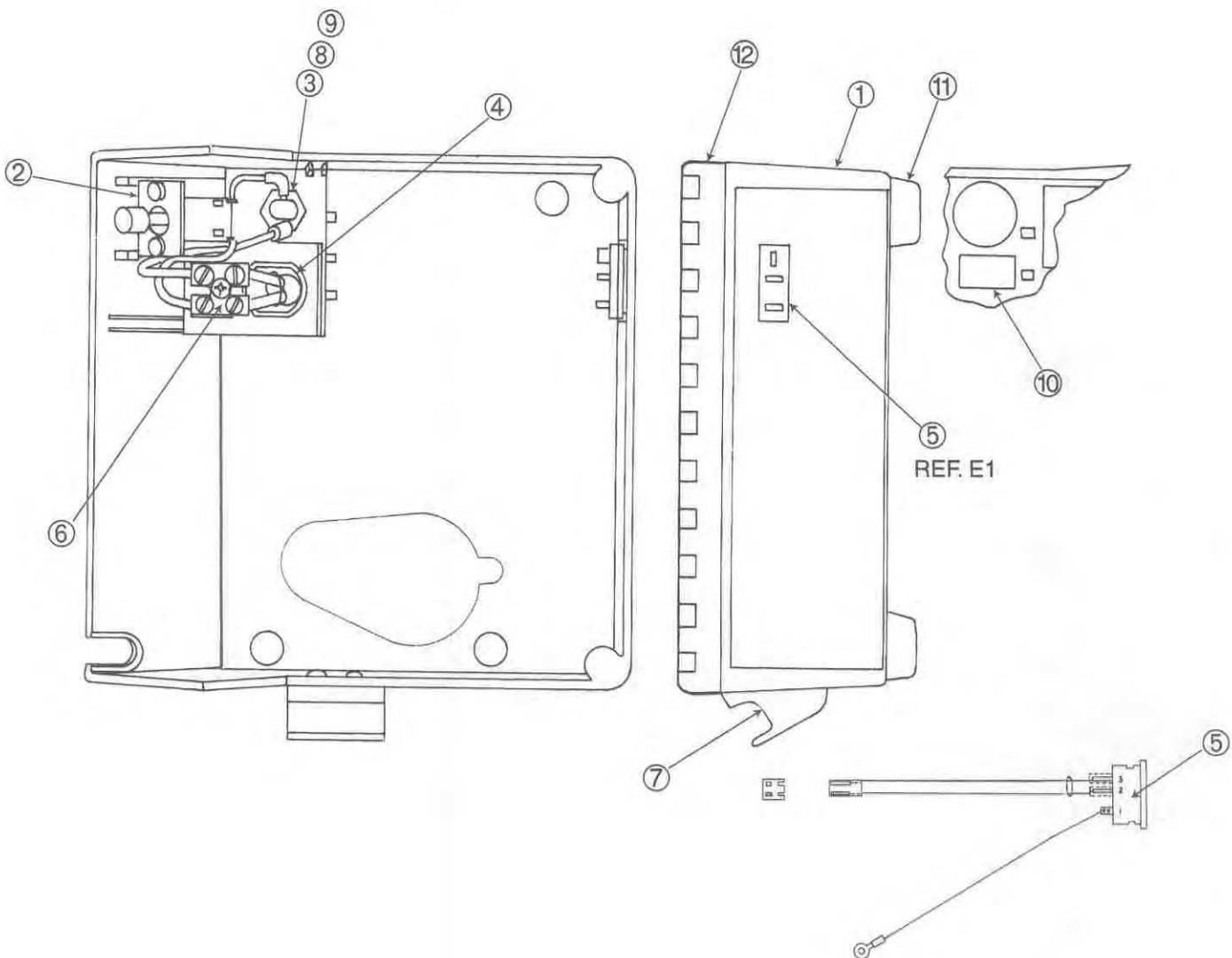
D1 – MODULE ASSEMBLY

Item	Qty.	Commodity No.	Description
1	1	776030117	P.C. Board Assy., REF D2
2	1	62472	Resistor 0.5 Ω 10 W.
3	1	776030118	Solenoid Valve Assy.
4	1	776030119	Connector Assy.
5	1	61467	Spacer, Nylon
6	1	61374	Transistor
7	1	61350	Washer, Insulating
8	1	776030122	Lug, Solder
9	2	61348	Bushing
10	1	776030280	Resistor 50 Ω 10W



D2 – P.C. BOARD ASSEMBLY (Oscillator Board)

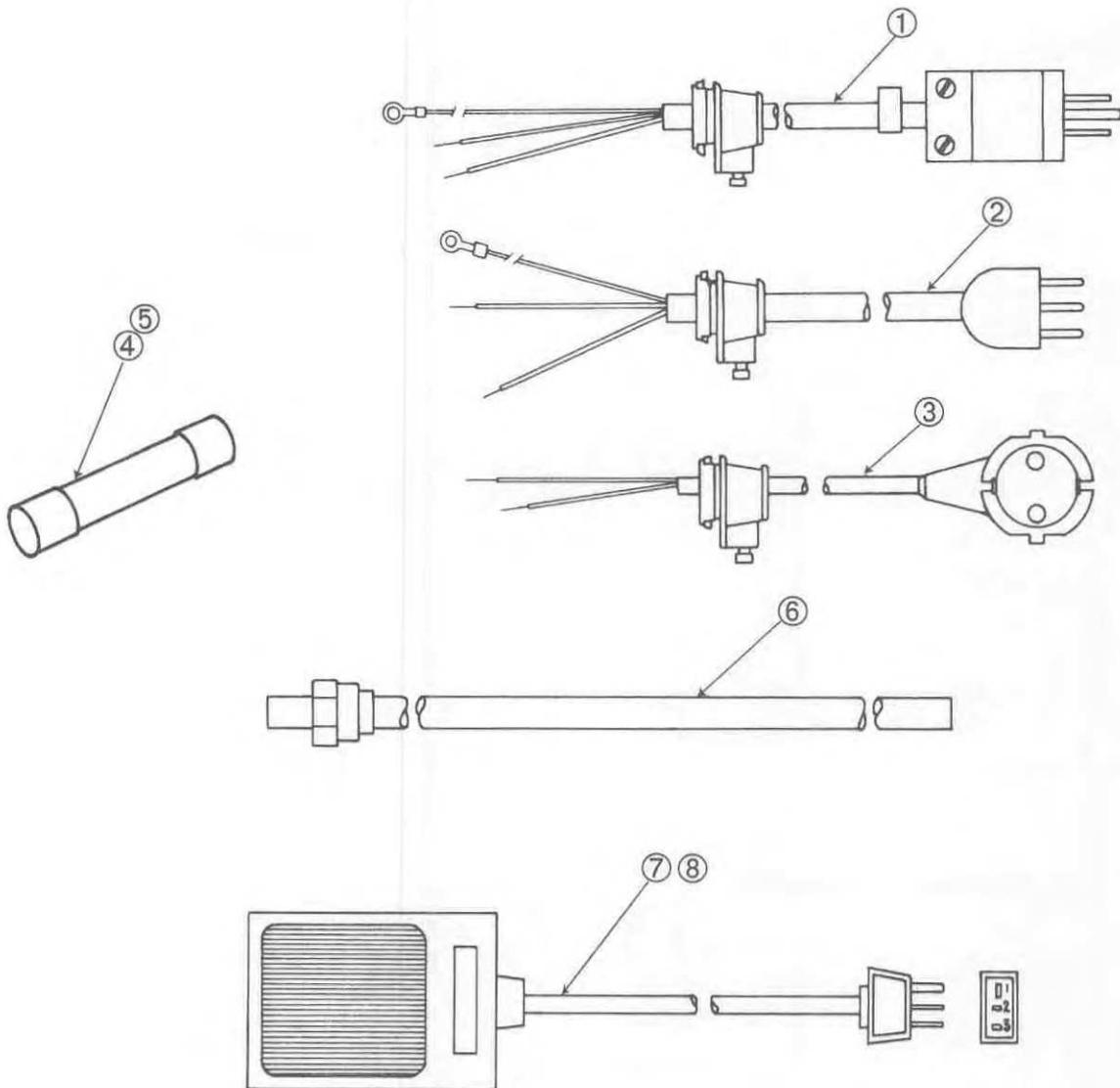
Item	Qty.	Commodity No.	Description
1	1	776030117	Oscillator PC Board Assembly – Complete



E1 – CABINET ASSEMBLY

Item	Qty.	Commodity No.	Description
1	1	776030148	Cabinet Base with Inserts
2	1	See Table	Switch Assy.
3	1	61280	Fuse Holder
4	1	See Table	Power Cord Assy.
5	1	776030151	Connector Assy. Foot Control
6	1	60484	Terminal Block
7	1	776030149	Handpiece Holder w/Inserts
8	1	See Table	Fuse A Slo-Bio
9	1	See Table	Fuse, Insert
10	1	See Table	Label, Fuse
11	4	61172	Bumper
12	1	776030258	Cover

Cabinet Assy.	Item 2	Item 4	Item 8	Item 9	Item 10
G110 DOM 115V	60417	60418	60485	61288	60486
G110A 240V	60534	60531	60537	60547	776030153
G110B 220V	60534	60531	60537	60547	776030153
G110C 115V	60417	776030150	60485	61288	60486
G110J 100V	60417	776030150	60485	61288	60486



ACCESSORIES

Item	Commodity No.	Description
1	60418	Power Cord Domestic (Hospital Grade plug)
2	776030150	Power Cord 100V & 115V
3	60531	Power Cord 220V & 240V
4	60485	Fuse for 115V & 100V Units
5	60537	Fuse for 220V & 240V Units
6	60388	Water Line & Nut Assy.
7	61187	Footswitch & Cable Assy., 100V & 115V
8	776030298	Footswitch & Cable Assy., 220V & 240V

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